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Science Response 2014/038

Maritimes Region

ASSESSMENT UPDATE OF GEORGES BANK SCALLOPS (*PLACOPECTEN MAGELLANICUS*)

Context

A meeting of the Maritimes Science Advisory Process was held 1 May 2013 at the Bedford Institute of Oceanography (BIO), in Dartmouth, Nova Scotia to assess the status of the scallop stock on Georges Bank in support of the management of the 2013 fishery (DFO 2013). Participants included DFO scientists, fishery managers, Aboriginal organizations, and industry.

The main scallop fishery on Georges Bank is conducted in zone 'a'. Georges Bank zone 'b' is a marginal growth area for scallops and has separate management measures. The purpose of this report is to update the key results from the previous assessment with data from 2013 in order to provide science advice for the management of the 2014 fishery. The assessment and advice presented in this document use the assessment framework established in 2009 (Jonsen et al. 2009) and updated in 2013 (DFO 2013), for Georges Bank zone 'a' only.

This Science Response reports results from the Science Response Process of 6 May 2014 on the Offshore Scallops Stock Status Update.

Analysis and Response

The 2013 total allowable catch (TAC) was 5,000 t for zone 'a' and 100 t for zone 'b'. Total reported landings were 5,001 t for zone 'a' and 107 t for zone 'b'. Based upon preliminary analysis of the 2013 fishery data and the annual stock survey data, an interim TAC of 5,000 t was set for the 2014 Georges Bank zone 'a' fishery and 200 t for zone 'b'.

Science advice is provided for this stock using a modified delay-difference model that integrates both fishery and survey data and is described in Hubley et al. (2013). Estimates of fully-recruited biomass in 2013 and projections of fully-recruited biomass for 2014 under various TAC scenarios are presented and compared to established reference points for this stock.

Fully recruited biomass, estimated to be 29,080 t in 2013, increased from the 2012 estimate (24,570 t) and is above the 27-year median biomass of 15,580 t (Figure 1). Recruit biomass, estimated to be 4,419 t in 2013 declined slightly from the 2012 estimate (4,805 t), but is still above the 27-year median biomass of 3,175 t. There is an extremely high probability (>0.99) that the 2013 biomass is currently above the upper stock reference (USR) and in the healthy zone. The model's forecast for 2014 biomass is 34,264 t, assuming a catch of 5,000 t (the interim TAC), no change in condition, and natural mortality rates similar to 2013. This represents an estimated 17 % increase in biomass from 2013.

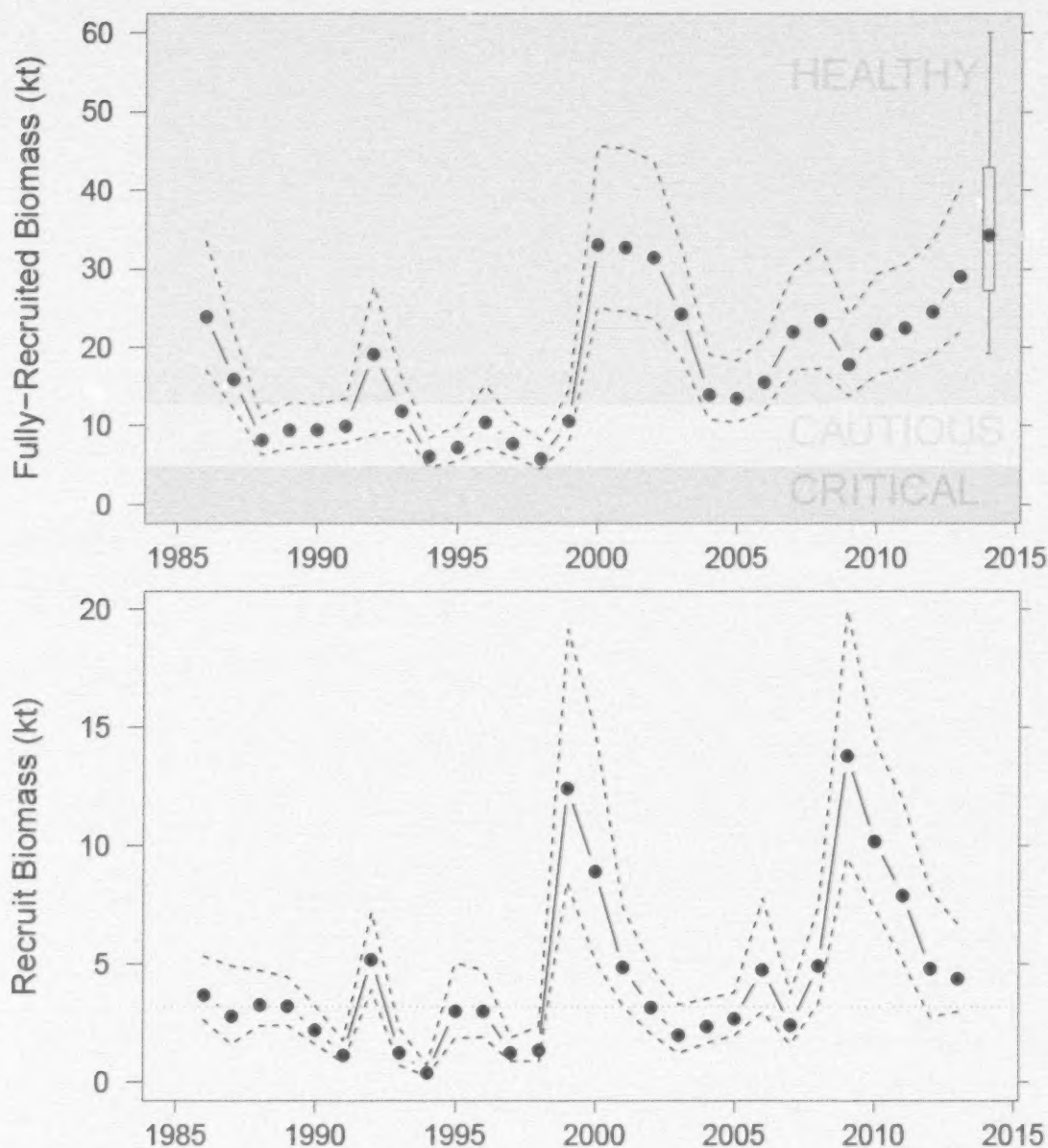


Figure 1. Biomass estimates for recruit and fully recruited scallops from the stock assessment model fit to the Georges Bank 'a' survey and commercial data. Dashed lines are the upper and lower 95% credible limits on the estimates. Coloured regions represent the healthy (green), cautious (yellow), and critical (red) zones when reference points are calculated as 80% and 30% of mean biomass, and the dotted line represents the 27- year median for recruitment. The forecasted fully recruited biomass for 2014, assuming a catch of 5,000 t, is displayed as a box plot with median (●), 50% credible limits (box) and 80% credible limits (whiskers).

Conclusions

An interim TAC of 5,000 t would result in an exploitation rate of 0.14 for 2014, and incoming recruitment is expected to be above the median. Harvest scenarios ranging from 3,000 t to 7,000 t are predicted to yield increases in commercial biomass with a probability of decline ranging from 0.29 to 0.42 (Table 1). The probability that biomass will remain in the healthy zone was very high (>0.97) for all harvest scenarios presented (Table 1).

Table 1. Harvest scenarios for Georges Bank 'a' in 2014 in terms of exploitation and expected changes in fully-recruited biomass. Potential catches in 2014 are evaluated in terms of the probability of a decline in biomass and exceeding reference points. These probabilities account for uncertainty in the biomass forecasts.

Catch (t)	Exploitation Rate	Probability of Biomass Decline	Expected Change in Biomass (%)	Probability biomass will exceed USR	Probability biomass will exceed LRP
3000	0.09	0.29	24.07	0.99	>0.99
3500	0.10	0.30	22.44	0.99	>0.99
4000	0.11	0.32	21.06	0.98	>0.99
4500	0.13	0.34	18.54	0.98	>0.99
5000	0.14	0.35	16.66	0.98	>0.99
5500	0.15	0.37	14.16	0.98	>0.99
6000	0.17	0.39	12.12	0.98	>0.99
6500	0.18	0.40	10.66	0.98	>0.99
7000	0.19	0.42	8.23	0.97	>0.99

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Sources of Information

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